of the legends he quotes, especially in regard to the animals and plants of distant lands.

The early writers whom the author quotes as his authorities form a long list of names. Among them are Friar Bartholomew and his editor Batman, whose works seem to have been the standard natural history of Shakespeare's boyhood; Topsell, so beloved of the late J. G. Wood; Gerard and Parkinson, as known by their respective *Herbals;* Holland, in his translation of Pliny's Natural History; and Evelyn, of *Silva* fame. Long quotations from these and other writers are given under the heading of the more important animals, plants, and jewels; contemporary illustrations being in many instances reproduced.

Many of these latter are of the quaintest, and form puzzles for the naturalist to discover the animals from which they were compounded. The crocodile, for example, is represented as a very marvellous complex animal, having a head which can scarcely have been taken from aught else but a wild boar, while in the armature of its back and fore limbs it recalls a pangolin; and the panther (p. 131) is more like a spotted hyæna than the creature it is intended to portray. What can have been the origin of the eight-rayed crest on the head of the serpent (p. 280), it is hard indeed to guess. But the most marvellous creature of all is the reputed whale (p. 341), which is a pig-faced, four-legged, scaly animal, with a long tail ending in flukes; the creature being represented as having just climbed on the poop of a vessel, with its head high up among the rigging. It has surely much more connection with certain modern stories of the sea-serpent than with any whale that ever swam.

That the author has succeeded in producing a very delightful and, to a certain extent, an instructive volume, may be freely granted. At the same time, it would have been decidedly an improvement had he given some explanation of the legends connected with real animals and plants, and likewise have offered suggestions as to the origin of mythical ones. As it is, the reader is left almost or completely in the dark on both these points. It is not as if nothing had been written in modern times upon such subjects. For instance, we find on p. 11 the following sentence: "And it is said that in Ethiopia be Ants shap [ed] as hornets, and diggeth up golden gravel with their feet, and keep it that it be not taken away." Now if the author had consulted a paper by the late Dr. Valentine Ball, published some years ago, we believe, in the *Proceedings of the Royal Irish Academy*, he would have found some interesting information concerning these gold-digging ants, and also about many legends connected with other animals, both real and fabulous. Again, when treating of sirens, or mermaids, the non-scientific reader would probably like to have been informed that the legend almost certainly originated from dugongs having been mistaken for sea-maidens. All that the early writers have said of the unicorn is very fully given, but a few words as to what modern authorities think as to the origin of the myth would surely have been acceptable. As it stands, we can, however, confidently recommend the work to all who are interested in learning what were the views of our non-scientific ancestors of two centuries ago as to the habits and uses of animals and plants of their own and foreign lands. R. L.

OUR BOOK SHELF.

Chapters on the Aims and Practice of Teaching. Edited by Prof. Frederic Spencer, M.A., Ph.D. Pp. viii + 284. (Cambridge: University Press, 1897.)

THIS book should be read by all who are interested in educational methods. With the chapters on the teaching of Greek, Latin, French, German, English and History, we are not much concerned; our only regret is that the methods of teaching languages described therein were not in use in our own schooldays.

As to the chapters on the teaching of various branches of science, we commend them to every earnest teacher. Geography is dealt with by Mr. H. Yule Oldham, who, beginning with the consideration of position, distance and area, as exemplified in the schoolground and parish, passes therefrom to the consideration of the British Isles and the earth as a whole. The plan of study he sketches makes geography a living science, instead of a demoralising exercise for the memory. Prof. G. B. Mathews plans an algebra course, and urges that the natural approach to the study of it is by the way of ordinary arithmetic. After simple arithmetical algebra come rules of sign, negative quantities, factors, geometrical progression, and then surds. The way to teach geometry is shown by Mr. W. P. Workman, whose many suggestive and practical hints will, perhaps, help teachers to see that the main function of the subject is intellectual discipline.

Methods of teaching physical science are described by Dr. R. W. Stewart. The method of teaching advocated involves theory, demonstrations, and individual laboratory work, but the research attitude of the learner is not advised; for, says Dr. Stewart, "Experimental work is of no value whatever unless the theoretical knowledge of the scholar is full enough to enable him to understand clearly the objects and the details of the experiment." Against this view we have Dr. H. E. Armstrong's remark, in his very helpful chapter on the teaching of chemistry, that "students are not to be *told* about things, or even to be *shown* things, but are to be trained to *solve problems* by experiment—that is to say, they are to be trained to *discover;* and their discoveries are to have reference to common objects and phenomena." Two brief chapters on the teaching of botany and physiology, by Prof. R. W. Phillips and Dr. Alexander Hill respectively, conclude the volume.

Education in this country will certainly gain by the publication of these chapters on pedagogic methods.

Star Atlas. By W. Upton. Pp. iv + 29, and plates. (London, and Boston, U.S.A.: Ginn and Co., 1896.)

THIS atlas is primarily intended as an educational guide for the amateur astronomer; and with this end in view, no stars fainter than the sixth magnitude have been charted, thus avoiding the crowding in of detail inseparable from more complete star atlases.

Stereographic projection is adopted throughout the series of six maps, two of which are circumpolar, showing northern and southern stars; the remaining four cover the regions lying between N. 40° and S. 40° declination.

In addition there are six key maps, plotted to half the scale of the principal series, showing only the chief stars, and having connecting lines drawn between the stars of each constellation. These will be found useful in passing from one constellation to another when searching for an object.

The explanatory text gives a brief outline of the history of the formation of constellation-areas, the names and designations of the stars, and the system of indicating magnitudes. Very representative and concise catalogues of double stars and nebulæ are given, and following these are lists of variable and coloured stars. The lettering and outlining of the groups is very legible; but it still seems usual for the ancient constellation figures to mask somewhat the resemblance of a star chart to the sky as

©1897 Nature Publishing Group

seen by the eye. It would be better if these were put in as finely as possible, if included at all. The atlas is well up-to-date; and, owing to this fact, will probably be useful to the professional as well as to the amateur. The star places are marked for the epoch 1900, and the Harvard photometry has been taken as the authority for the magnitudes, the positions being derived chiefly from Argelander's Uranometria Nova. For observers possessed of instruments of moderate size, this atlas will probably prove a useful companion.

A Protest against the Modern Development of Unmusical Tone. By Thomas C. Lewis. Pp. 46. (London: Chiswick Press, 1897.)

THE prevalent practice in organ-building of the present day is to use for the middle C a pipe too large in scale, and with mouths cut too high, the result being, according to the author, that the Diapason tone, which rules every other stop in an organ, has deteriorated in quality. A pipe which will give an ideal Diapason tone is specified, and the defects in organs which do not conform to the conditions laid down are criticised. The protest as regards church bells is chiefly directed against excessive thickness. In pianofortes the destruction of pure tone is held to be due "to an increase of heaviness in the hammers for the pounding of the strings, to an excess of rigidity in the framework and setting, counteracting the vibrating motion of the strings—to an excess of scale in the length of strings—to the production of false harmonics, and the absence of due proportion between the ground-tone and the harmonics, and generally to the making of more noise than music in the quality heard." The brochure contains some interesting information on the principles of the construction of organ-pipes, bells, and pianofortes.

Respiratory Proteids, Researches in Biological Chemistry. By A. B. Griffiths, Ph.D. Pp. v + 126. (London: L. Reeve and Co., 1897.)

THE conclusion which the author of this book aims at establishing is that there are several respiratory proteids (both coloured and colourless) in the blood of animals. The introductory chapter, occupying one-third of the pages of the book, brings together some interesting information on the constitution of the blood of echinoderms, annelids, insects, arachnids, crustaceans, molluscs and vertebrates. Following this are chapters on various respiratory pigments found in the blood of certain animals, and on colourless respiratory proteids. Chapters on the nature and functions of chlorophyll and hæmoglobin conclude the text. An appendix is devoted to brief descriptions of the chemical compositions of the chief pigments which occur in the bodies of animals, and the methods by which they may be extracted.

The book should be serviceable in directing attention to the comparatively neglected field of biological chemistry, even if all the views it contains as to biochemical processes are not accepted.

Outlines of Psychology. By Wilhelm Wundt. Translated by C. H. Judd. Pp. xviii + 342. (Leipzig: Wm. Engelmann. London: Williams and Norgate, 1897.)

THIS book differs from the other works of Prof. Wundt in being more purely psychological, the physiological aspect of the subject being kept as much as possible in the background. Like the other works, it is an exposition of the special attitude of the author rather than a critical account of the present state of knowledge on the subject; but this is a feature common to most psychological text-books. For those who wish to learn the views held by the leader of one of the chief schools of modern psychology, the present volume will serve excellently. The translation is good, and Dr. Judd has added a useful glossary giving the German equivalents of the chief psychological terms used.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Organised or Sectional Work in Astronomy.

THE remark was recently made by Prof. S. C. Chandler that, notwithstanding there had been no recent systematic arrangement of work in connection with variable stars, the result was most gratifying; for the observations were fairly complete, few interesting objects having been neglected. He says that "this satisfactory result could hardly have been reached so effectively by a formal organisation of work directed from headquarters, prescribing and circumscribing the operations of each participant, and destroying by its benumbing influence the enthusiasm which springs from the individual initiative of the observers themselves."

This statement emanating, as it does, from a thoroughly practical man, and being based on unequivocal facts, must commend itself to the consideration of every one interested or engaged in the sectional work of various societies. It is evidently a point worth inquiry, as to whether Prof. Chandler's remark applies with equal force to other departments of astronomy besides that of variable stars. Having had some little experience in the sectional work of the Liverpool and other astronomical associations, I may perhaps be allowed to express the opinion that, while in some branches there is great utility in co-operation, in others the material advantage is rather questionable. In comet-seeking the division of labour seems eminently desirable, because one observer cannot possibly examine all the available sky at sufficiently short intervals. In meteoric researches, also, concerted effort is most valuable for the purpose of securing duplicate observations. Amateurs, by pre-arranging the hours for simultaneously watching the heavens, and the particular region for each one to observe, are enabled to secure a number of observations of identical objects, and the real paths of these may be derived from the materials gathered in this way. If left to independent effort, the chances of success would be greatly diminished, and the accuracy of the observations impaired; for a person when engaged in special combined work is apt to put forth his best energies, and the appearance of a large meteor is not likely to find him unprepared, unless it comes at a time not included in the prescribed hours of work.

But, in some other departments of observation, there does not appear to exist the same necessity for organised effort. In fact, I think that it can be shown from results—the best of all tests—that it has been a comparative failure as far as it affects the progress of astronomy. Of course a great deal depends upon the director of a section. If he is a man of great resource and skill, he will be pretty sure to have something tangible to show for his work, and that of his colleagues. The worst of it is that, in publishing collective results, the good, bad, and indifferent are indiscriminately presented; and there being, perhaps, no criterion by which to distinguish them, the whole are virtually rendered useless. Taking any band of unselected observers those of moderate or poor capacity will greatly predominate. Even in meteoric astronomy, I would not, for an instant, recommend that the results of several observers should be combined with the idea of accurately determining the positions of radiant points. In such cases the bad or moderate observations swamp the trustworthy ones, and we can get radiants anywhere or nowhere, just as we like to interpret the evidence afforded by the materials before us. It is a most important requirement that really precise observations should be preserved from contact or collaboration with others of inferior character.

A little reflection will prove that all the best work has been accomplished by individual and independent effort. A good man will persevere in his labours, just the same, whether he belongs to any combination or not; and it is really much better for such a person to be isolated, so that he may perform the work of his choice in his own way, and publish it in his own style. If a man has the ability to accomplish useful work, he will know the best form in which it may be presented for the benefit of science. Moreover, he needs no encouragement; he proceeds with his research because he is actuated by the love of it, and sees the beacon of success shining invitingly in the foreground.

Undoubtedly, cases could be cited where combined work has been or will be most efficacious. In an object of exceptional

©1897 Nature Publishing Group